

Upper Porcupine Creek Yellowstone Cutthroat Trout Restoration Plan



Date: January 2011

Introduction

Yellowstone Cutthroat trout (YSC) have been identified as a species of conservation need in Wyoming (WGFD 2010) and throughout their range (Range-wide YCT Conservation Team 2009). The fish are classified as a NSS2 species in Wyoming due to restricted distribution and vulnerable habitat. The primary threats to YSC are the introductions of hybridizing and competing trout species. The conservation actions identified as necessary for the survival of YSC include restoring the species within suitable portions of their historic range that are currently

uninhabited or where competing or hybridizing species can be removed. This project would address this need by eliminating nonnative brook trout (competing species) from the Porcupine Creek Drainage above Porcupine Falls and replacing them with YSC.

Project Need

Yellowstone cutthroat trout are the only trout native to Big Horn Mountains and were known to occur in the Porcupine Creek Drainage below the falls prior to displacement by introduced nonnative trout in the last century. Yellowstone cutthroat trout have been eliminated from more than 90% of the streams they once occupied in the Big Horn Mountains. In the Porcupine Creek drainage, YSC have been completely eliminated in all but the headwaters of Trout and Deer Creeks. Long term survival of these two populations is problematic due to isolation and limited habitat. Additionally the long term persistence of YSC in the Big Horn Mountains is uncertain without management actions that provide substantial refugia.

Project Area

The entire project basin lies within the Big Horn National Forest. Named streams involved in the project include Porcupine, Bald Mountain, Wyoming Gulch, Long Park and Pasture Creeks. Nonnative trout removal would be necessary from all streams where they are present (Figure 1). The project basin has 20.1 stream miles currently occupied by fish.

Streams in the project basin originate on the slopes of Medicine, Bald and Cone Mountains (near 10,000 ft). Water in the basin flows northwesterly passing over Porcupine Falls at an elevation of 8,130 ft (269716 E, 4970784 N Z13, NAD27). Stream in the basin are characterized as low to moderate gradient with primarily fine granitic substrates. Streams in the basin meander through wide willow complexes and dense pockets of conifers. Historically beaver complexes were common in the basin. However no beaver have been observed in the last decade. With the exception of the falls, there are no barriers to fish movement within the project area.

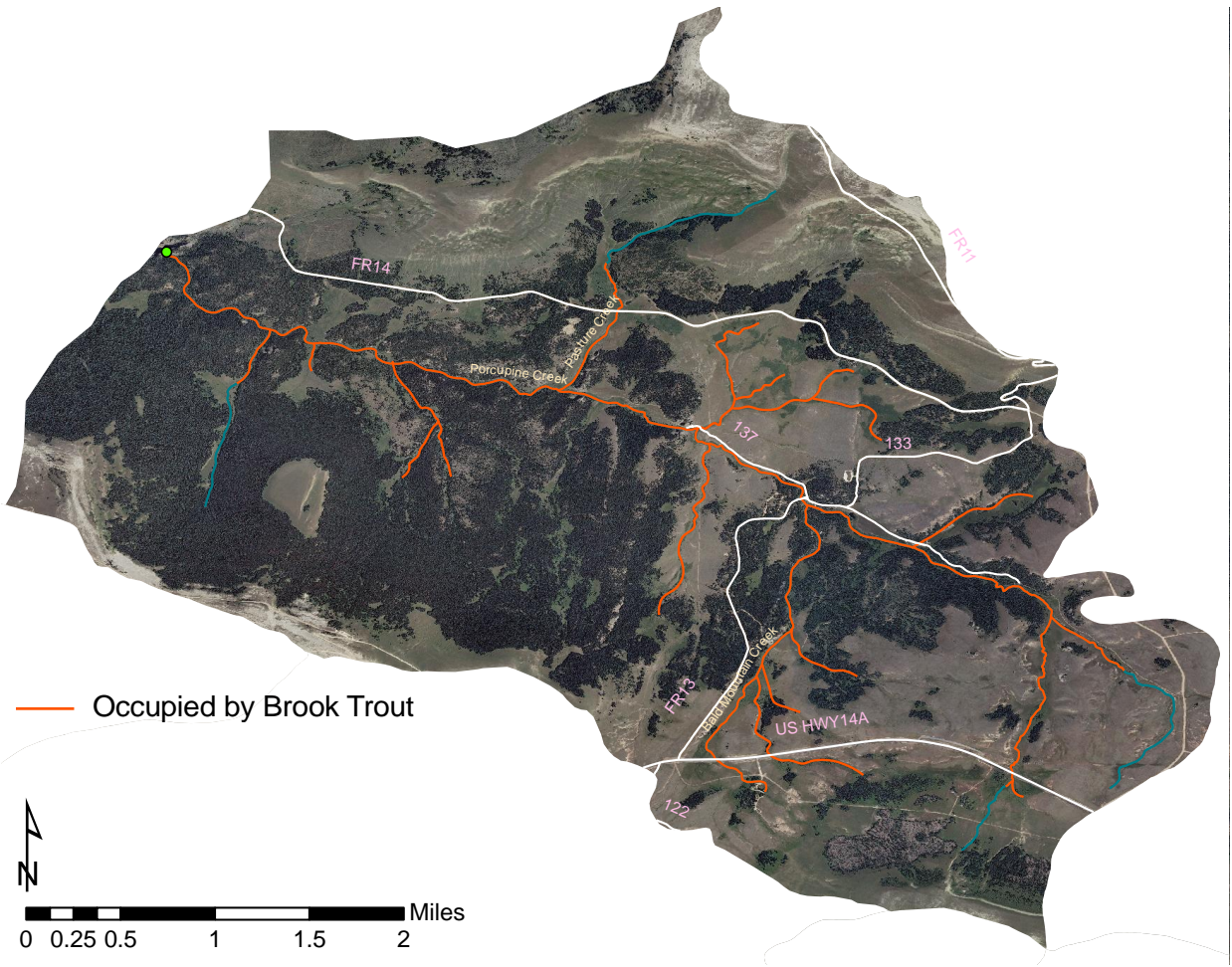


Figure 1. Brook trout occupation in Porcupine Creek drainage above Porcupine Falls. Area occupied above the falls by brook trout constitutes the proposed treatment area.

Water

Discharge at the downstream end of the project area was approximately 10 cfs in August 2005. Bald Mountain Creek is the largest tributary by volume contributing about 2 cfs in August 2005. Daytime maximum water temperatures in Porcupine Creek during the July-August 2006 period ranged from 45 to 54°F (Figure 2). The stream is slightly alkaline with pH ranging from 7.5 to 7.7.

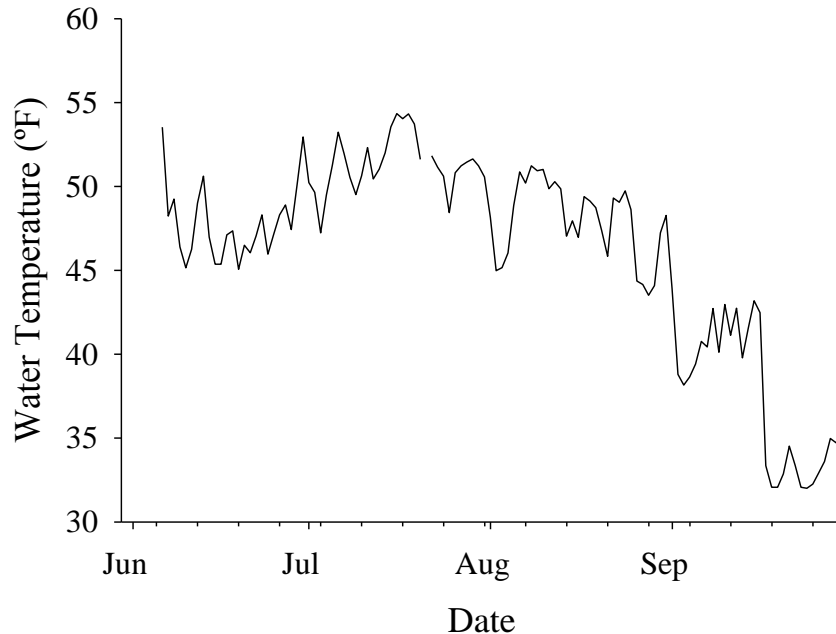


Figure 2. Hourly stream temperature during 2006 in Porcupine Creek (elevation 8,725 ft).

The USFS holds all water rights within the project area. Surface water is diverted from Porcupine and Bald Mountain Creeks and groundwater sources for use by summer home residents. The lodge and campgrounds use groundwater.

Fishery

Brook trout are the only fish present above Porcupine Falls except for catchable sized YSC that are stocked annually in Cow Camp and Medicine Wheel Ponds. Brook trout are present in 20.1 miles of stream above the falls (Table 1). Brook trout originated from WGFD stocking which began in 1936. Additional stocking has included cutthroat (unknown sub-species) and rainbow trout. No stocking has occurred in streams above the falls since 1994. No documented fish surveys were conducted in the drainage prior to stocking. The first formal fishery surveys in the drainage occurred in 1994 when biologists found abundant brook trout and few stocked rainbow trout. Surveys throughout the drainage in 2005 found brook trout biomass ranging from 31 to 253 pounds/mile in tributaries and 166 to 277 pounds/mile in Porcupine Creek. The more than 900 brook trout measured in 2005 averaged just over six inches in length.

Table 1. Streams in the project area and number of miles occupied by fish.

Stream Name	Miles Occupied
Bald Mountain Creek	4.6
Long Park Creek	0.4
Pasture Creek	1.0
Porcupine Creek	6.5
Wyoming Gulch	1.6
Unnamed Tributaries	6.0
Total	20.1

Angling pressure within the project area is moderate during the July-August period. The stream is the most accessible trout fishery for anglers from Lovell. The drainage is a popular area for recreation largely due to a substantial network of roads that provides easy access and multiple dispersed camping sites. The USFS operates two improved campgrounds in the drainage and has a seasonal staff at the Medicine Wheel Ranger Station. There is one commercial lodge along Bald Mountain Creek (Wyoming High Country Lodge) and numerous private summer homes operating under USFS Special Use Permits along Porcupine and Bald Mountain Creeks. The USFS has one outfitter permitted to guide anglers on Porcupine Creek.

Proposed Action

The only option currently available for restoring or creating refuge for YSC in Porcupine Creek will require the chemical removal of all non-native trout. The geography of the drainage area above the falls provides the opportunity to create a relatively large refugia for YSC with the falls as a barrier to re-invasion.

Prior to undertaking any action, a substantial effort will need to be made towards public outreach and information dissemination. Prior to treatment, anglers would be encouraged to harvest creel limits of brook trout from the drainage. Treatment could be targeted for late summer after the peak recreation season and when summer home water use has ended.

The stream would be treated with rotenone dispensed at 0.5-1.5 ppm for 8 hours. Rotenone drip jugs would be placed at 1.5 hour flow intervals along streams. Live cars with sentinel trout would be placed upstream of drip stations to evaluate treatment effectiveness. Sand mix rotenone would be applied to seeps, springs, puddles and other areas with poor or little mixing. Rotenone would be detoxified above the falls and at other strategic points in the drainage with potassium permanganate (KMnO₄) dispensed at >2 ppm. A secondary detox station would be manned 30 minutes of flow downstream of the falls. The secondary detox would dispense KMnO₄ only if sentinel fish at the location show signs of rotenone exposure. Public use of the stream in the immediate vicinity of the treatment area would be discouraged during the

application. Dead fish would be removed from areas with substantial human traffic (campgrounds, summer homes, roads, etc.).

The treatment would be repeated a second year, and additional spot treatments could be necessary a third year.

Catchable sized YSC would be stocked into the stream following the first years treatment to provide nearly continual angling opportunity in the stream. These fish would serve as sentinels in the second year of treatment. Following the removal of all brook trout (likely two years following project initiation) the stream would be stocked with catchable and fingerling sized YSC. Stocking would continue following treatment until the population showed evidence of reasonable self sufficiency (a minimum of three years).

Project Benefits

There are several benefits of removing brook trout in Porcupine Creek and returning YSC. The establishment of a relatively large interconnected YSC population in the Big Horn Mountains would greatly benefit the long-term survival of the species. Additionally, anglers would realize a fishery with larger fish to capture/harvest. The establishment of an accessible YSC population within the Big Horn Mountains is likely to attract angler interest in the stream.

Rotenone

Rotenone is a natural compound found in certain tropical plants. The compound has been used by native people for centuries to collect fish for consumption. Rotenone is used as an insecticide and pesticide applied to garden crops, poultry and livestock. Rotenone is a very effective compound for killing fish because it is lethal in very small amounts (1/2 to 1 part rotenone per million parts of water). Rotenone kills fish by interfering with cellular processes, it does not suffocate fish. Rotenone is rapidly bio-degradable when exposed to sunlight, air and soil. Rotenone is completely oxidized in mountain streams within a few hours. Rotenone does not penetrate soils and is not found in groundwater. Rotenone only kills aquatic organisms with gills. This includes, aquatic invertebrates, fish, and early stage amphibians. Rotenone does not affect birds or mammals that drink or come into contact with treated water or fish killed by rotenone. Rotenone does not affect scavengers that consume fish killed by organisms. Although rotenone is used on garden crops, poultry, livestock and to capture fish for consumption in South America a safe level of consumption hasn't been established in the U.S. Because a safe level of consumption hasn't been established, fish killed in rotenone treatments in Wyoming can't be collected for consumption and water with active rotenone can't be recommended for human consumption.